VACUUM PACKAGING METHOD AND MECHANISM

FIELD OF THE INVENTION

The present invention relates to a vacuum packaging method and mechanism adopted for use for a sealing body which contains a core material and particularly to a direct vacuuming method that is coupled with a special vacuumed apparatus to seal the sealing body that contains the core material in a vacuum condition.

BACKGROUND OF THE INVENTION

The vacuum packaging technique was first developed in 1940s. Since 1950, with successful developments of polyurethane and polystyrene films, vacuum packaging techniques for merchandise packaging have been developed rapidly. Vacuum package generally is to place goods in an airtight container, and evacuates the air inside the container before sealing the opening of the container. Its main purpose is to prevent oxygen and moisture from entering the container to avoid microbes from breeding in the container or the goods from oxidizing and deteriorating. It also can prevent the container from being expanded or cracked. This happened in the past when package was sealed thermally. . Vacuum packaging can be used for a wide variety of goods, such as processed meat and grains, and electronic products that might be degraded by oxidation. The vacuum packaged goods generally have a shelf life as much as three times of the goods not being vacuum-packaged. When the core material are open-cell polystyrene foams, open-cell polyurethane foams, carbon/silica aerogel or the like, the thermal insulation effect of the vacuum insulation panel is three to seven times the conventional blowing PU. Moreover, the vacuum condition of the sealing body can be maintained

without degrading when air and moisture permeability is low. Therefore it can be used for a long period of time in refrigerators or other apparatus that need to preserve temperature.

Although the conventional direct vacuuming techniques do not have dimensional limitation for the sealing body, and are applicable for packaging versatile of goods in small quantities, during vacuuming the pressure difference between the interior and exterior tends to create creases on the sealing body that contains core material. This not only makes packaging quality difficult to control, using fixtures to anchor the sealing body also tends to damage the structure of the gas deterrent film during thermal sealing operation. To remedy the foregoing problems, U.S. patent No. 6,106,449 discloses a vacuum insulated panel and container that coats a leak-proof oil on an evacuation tube and inserts the evacuation tube into an evacuation hole of the sealing body until reaching the core material contained in the sealing body. This prevents creases caused by the pressure difference during the vacuuming operation and block outside air from entering the sealing body. While it can improve the vacuum quality, its production process is complex. The production process takes much more time. The quality is difficult to control. It creates a lot of inconveniences to operators.

SUMMARY OF THE INVENTION

Therefore the invention aims to resolve the problems mentioned above by providing a vacuum packaging method and mechanism that does not require coated leak-proof oil and does not have dimensional limitations. Further, it should be applicable to products in varying quantities, and also should provide a simplified production process to make quality control easier. The invention can be added modularly according to preference.

The vacuum packaging method and mechanism according to the invention includes a

vacuuming apparatus that has a front end and a periphery for drawing air respectively, an airtight compression module and a thermal press sealing apparatus. The method includes, first, encasing a core material in a sealing body by thermal sealing that has a reserved opening. Second, inserting the vacuuming apparatus into the reserved opening until in contact with the core material in the sealing body. Third, using the vacuuming apparatus to draw air through the periphery thereof so that the sealing body around the reserved opening is adsorbed smoothly to the vacuuming apparatus, and partly seals the surrounding of the reserved opening. This prevents external air from seeping in. Thereby, the front end of the vacuuming apparatus can draw air to keep the sealing body in a desired vacuum condition. Finally compress and thermally seal the reserved opening to seal the sealing body in the desired vacuum condition and encase the core material in the sealing body.

The foregoing, as well as additional objects, features and advantages of the invention will be more readily apparent from the following detailed description, which proceeds with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a process flow chart of the invention

FIG. 2 is a perspective view of the vacuum packaging mechanism of the invention.

FIG. 3 is a schematic view of the vacuuming apparatus of the invention with a sealing body adsorbing thereon.

FIG. 4 is a schematic view of the sealing body with a reserved opening and the surrounding of the adsorption area.

FIG. 5 is a schematic side view of the vacuum packaging mechanism.

FIG. 6 is a schematic view of the vacuuming apparatus in a vacuuming condition.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 5, the vacuum packaging mechanism according to the invention includes a pair of corresponding thermal press sealing apparatus 40, a pair of corresponding airtight compression modules 20 and a vacuuming apparatus (not being marked in FIG. 5) encased by a sealing body 30. As shown in FIG. 5, the vacuuming apparatus 10 is encased in the sealing body 30 that is clamped between the airtight compression modules 20, and the airtight compression modules 20 are located between the thermal press sealing apparatus 40. Also referring to FIG. 2, the airtight compression module 20 includes a U-shaped upper plate 21 and a U-shaped lower plate 26 that have respectively a rubber sealing pad 22 and 27. The upper plate 21 and lower plate 26 may be turned about one side of the plate to clamp the vacuuming apparatus 10 in the center portion thereof. The vacuuming apparatus 10 has a cross section flattened like an eye with two convex sides that is thicker in the middle and has a porous section 12. In this embodiment, the porous section 12 is a sintered powder metallurgy substance through which the vacuuming apparatus 10 can draw the air while the rest portion is air impermeable. The vacuuming apparatus 10 has a front end forming a flattened reciprocal air suction module 13 which may be located in a rectangular opening 14 of the vacuuming apparatus 10 in an extendable manner.

Referring to FIG. 6, the sealing body 30 contains a core material 33 and is thermally sealed around the core material except a reserved opening 31 (step 101), which is slightly larger than the vacuuming apparatus 10, to allow the vacuuming apparatus 10 to be moved in and out of the sealing body 30. The front end of the air suction module 13 can run through the reserved opening 31 of the sealing body 30 and be extended inwards until reaching the core material 33 housed in the sealing body 30 (step 102). Then the

vacuuming apparatus 10 can be activated to draw air around the porous section 12 of the vacuuming apparatus 10 so that the sealing body 30 is outside the heat seal section 32. However, abutting the reserved opening 31 will be adsorbed onto the vacuuming apparatus 10 to bond the sealing body 30 to the vacuuming apparatus 10 and prevent producing creases (step 103). Then the upper and lower U-shaped plates 21 and 26 of the air tight compression module 20 are moved along the periphery of the vacuuming apparatus 10 and clamp the vacuuming apparatus 10.The sealing body 30 is adsorbed on the vacuuming apparatus 10 in the center (as shown in FIG. 4), so that the surrounding of the reserved opening 31 of the sealing body 30 forms a local sealing (step 104). Thereby, the interiors of the sealing body and the core material are isolated from the exterior, and external air cannot enter the sealing body. Thereafter, air can be drawn through the front end of the reciprocal air suction module 13 until the vacuum condition of the sealing body 30 reaches a desired degree (step 105). Then the reciprocal air suction module 13 will retract automatically into the vacuuming apparatus 10. In order to maintain the sealing body 30 in a desired vacuum condition after being vacuumed, the thermal press packaging apparatus 40 can be used to compress the airtight compression module 20, to make sure that no air has passed through the reserved opening 31 to the sealing body 30. Then the reserved opening 31 is thermally sealed. Thus air is completely blocked from entering the sealing body 30 (step 106). Referring to FIG. 5, after the thermal press packaging apparatus 40 completes the thermal sealing, the pressure to the airtight compression module 20 will be released automatically, and air drawing at the porous section 12 of the vacuuming apparatus 10 will be stopped. Then the packaged sealing body 30 can be removed easily.